

Carmen Cabrera-Arnau

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Education

- 2017-21 PhD in Applied Mathematics, University College London (UK)
Thesis: Mathematical modelling of social phenomena in urban areas
Supervisor: Prof Steven Bishop
Examiners: Prof Denise Pumain (University Paris I Pantheon-Sorbonne) and Prof Frank Smith (UCL)
- 2016-17 MSc in Complex Systems, King's College London (UK)
Dissertation: Random matrices spectra, towards the solution of the Bray-Rodgers equation
Supervisor: Dr Pierpaolo Vivo
Grade: Distinction
- 2012-16 BSc in Physics, University of Valencia (Spain) with year abroad at Imperial College London (UK)
Dissertation: Obtaining geometric characteristics of a directed acyclic graph from its causal structure
Supervisor: Dr Tim Evans
Grade: 9.15 out of 10, equivalent to First Class Honours

Current academic appointments

- 2022- Lecturer in Geographic Data Science, Geographic Data Science Lab (GDSDL), University of Liverpool

Honorary appointments

- 2022- Honorary Lecturer, Centre for Advanced Spatial Analysis, UCL

Prior academic appointments

- 2021-22 Postdoctoral Research Fellow in Urban Mobility, Centre for Advanced Spatial Analysis, UCL
2017-21 Postgraduate Teaching Assistant, Department of Mathematics, UCL

Publications

PEER-REVIEWED JOURNAL ARTICLES

- 2023 [C Cabrera-Arnau](#), C Zhong, M Batty, R Silva, SM Kang. [Inferring urban polycentricity from the variability in human mobility patterns](#). *Scientific Reports* **13**.
- 2022 Y Wang, C Zhong, Q Gao, [C Cabrera-Arnau](#). [Using Twitter to track internal migration before and during the COVID-19 pandemic in the UK](#). *Urban Informatics* **1**, 15.
- 2022 R Prieto Curiel, [C Cabrera-Arnau](#), S R Bishop. [Scaling beyond cities](#). *Frontiers in Physics* **10**.

- 2021 [C Cabrera-Arnau, S R Bishop. Urban population size and road traffic collisions in Europe. *PLOS ONE* 16\(8\): e0256485.](#)
- 2020 [C Cabrera-Arnau, S R Bishop. The effect of dragon-kings on the estimation of scaling law parameters *Scientific Reports* 10: 20226](#)
- 2020 [C Cabrera-Arnau, R Prieto Curiel, S R Bishop. Uncovering the behaviour of road accidents in urban areas. *Royal Society Open Science* 7: 191739](#)
- 2020 [R Prieto Curiel, C Cabrera-Arnau, M Torres Pinedo, H González Ramírez, S R Bishop. A continuous binning for discrete, sparse and concentrated observations *Methods X* 7: 100709](#)
- 2019 [R Prieto Curiel, C Cabrera-Arnau, M Torres Pinedo, H González Ramírez, S R Bishop. Temporal and spatial analysis of the media spotlight. *Computers, Environment and Urban Systems* 75: 254 – 263](#)

PREPRINTS

- 2024 [N Newsham, P Kumar, C Cabrera-Arnau, and F Rowe A Long Short-Term Memory Forecast of sub-National Population Change Across Europe. *OSF preprints* 10.31235/osf.io/9azqy .](#)
- 2024 [M González-Leonardo, C Cabrera-Arnau, R. Neville, A. Nasuto, F. Rowe. “Urban Exodus” During COVID-19 in Mexico? Using Digital Data to Analyze Medium-Term Pandemic Impacts on Internal Population Movements. *OSF preprints* 10.31219/osf.io/e4au9.](#)
- 2024 [Policy report: F Rowe, C Cabrera-Arnau, M González-Leonardo, A Nasuto, R Neville. Reduced mobility? Urban exodus? Medium-term impacts of the COVID-19 pandemic on internal population movements in Latin American countries.](#)
- 2023 [C Cabrera-Arnau, LW Ng, H Wong, C Zhong. The temporal concentration of travel demand in an urban transport network. *arXiv*:2310.02385v1.](#)
- 2023 [A Renninger, V Marin Maureira, C Cabrera-Arnau, R Prieto-Curiel. Detecting the sensitive spots in the African interurban transport network. *arXiv*:2307.06402v1.](#)

WORK IN PREPARATION

Article: [C Cabrera-Arnau, M González-Leonardo, A Nasuto, R Neville, F Rowe. The influence of socio-economic deprivation on the recovery of urban mobility after COVID-19 in Latin America.](#)

OTHER

- 2021 [Alan Turing Institute Data Study Group team. Data Study Group Final Report: Odin Vision. Zenodo *The Alan Turing Institute, Publications & policy submissions.*](#)
- 2021 [C Cabrera-Arnau. Mathematical modelling of social phenomena in urban areas. Doctoral thesis \(PhD\). *University College London.*](#)

Funding

RESEARCH GRANTS

- 2024 [Economic and Social Research Council \(ESRC\) - “DEBIAS. Developing a framework to measure and correct biases in human mobility data extracted from digital footprints”. CoI. 2024. £185,084.14.](#)
- 2024 [Research England, University of Liverpool - “TIMELY. Validating an up-to-date dataset of internal migration to inform local and regional-scale spatial planning strategies in Chile”. Public Support Fund, 182341.](#)

CoI. 2024. £74,136.53.

2023 *Research England, University of Liverpool* - "RECAST. Strengthening partnerships with the United Nations: Building capacity in digital footprint data for COVID-19 recovery". Public Policy Quality-Related Pump-Priming Fund, 177990. CoI. 2023. £89,913.60.

TRAVEL GRANTS AND FUNDED RESEARCH VISITS

2024 *Barcelona Supercomputing Centre, Spain* - Research visit. Travel grant: 1,000€.
2023 *University of California Santa Barbara, US* - Specialist Meeting 2023. Travel grant: \$800.
2018 *NTU, Singapore* - Winter School on Complexity Science, Singapore. Travel grant: £1,837.
2015 *IFISC (CSIC-UIB), Spain* - "Chimera states in an oscillator network under non-local coupling effects". Summer Undergraduate Research Fellowships. PI. 2015. 1,100€.

SCHOLARSHIPS AND STUDENTSHIPS

2017-21 *Department of Mathematics, UCL*. Teaching Assistantship to complete fully-funded PhD studies.
2019-20 *Department of Mathematics, UCL*. Monica Hulse Scholarship, awarded yearly to one postgraduate student based on academic merit. £500.
2016-17 *Department of Mathematics, King's College London*. E T Davies Scholarship, awarded yearly to one or two outstanding applicants. £1,000.
2016-17 *La Caixa*. Scholarship awarded to 65 top Spanish candidates to complete postgraduate studies abroad. £27,000.

Honours and awards

2024 Fellow of the Higher Education Academy
2021 Associate Fellow of the Higher Education Academy
2021 Nominated & invited to the Global Young Scientists Summit, National Research Foundation, Singapore

Talks

INVITED TALKS

2024 BT, London, UK — online
2024 Spatial, Computational, and Real-Time Analytic Methods (SCRAM) Working Group — online
2024 Escuela de Negocios, Universidad Adolfo Ibáñez, Viña del Mar, Chile
2024 Departamento de Ciencias de la Computación, Universidad de Chile, Santiago, Chile
2024 Urban Beers, Santiago, Chile
2024 EchonophysiX, Ecole Polytechnique, Paris, France — online
2023 EdinbR, Edinburgh, UK
2023 Department of Human Geography lecture series, University of Toronto, ON, Canada — *Cancelled*
2023 Quantitative Spatial Science seminar, University of Bristol, UK
2022 Disordered Systems Group seminar, King's College London, UK
2022 Geographic Data Science Lab seminar, University of Liverpool, UK
2022 Centre for Complexity Science seminar, Imperial College London, UK
2022 Early Career Researchers in Mathematics (ECRM) conference, UCL, UK — *Plenary talk*
2022 Networks seminar, Centre for Advanced Spatial Analysis, UCL, UK
2021 Networks seminar, Centre for Advanced Spatial Analysis, London, UK
2021 Disordered Systems Group seminar, King's College London, UK

2020 Complexity Lates, London Institute for Mathematical Sciences, UK
2019 Postgraduate Seminar, Dept of Mathematics, UCL, UK

CONTRIBUTED TALKS

2024 Complenet, Exeter, UK
2023 Korean Research Institute of Human Settlements & GDSL knowledge exchange, Seoul, South Korea
2023 GISRUK, Glasgow, UK
2022 Korean Research Institute of Human Settlements & GDSL knowledge exchange, Liverpool, UK
2022 Conference on Complex Systems, IFISC, Palma de Mallorca, Spain
2022 GISRUK, Liverpool, UK
2020 Graduate Student Meeting, London Mathematical Society, UK — *Awarded best talk*
2019 Poster presentation at Latin American Conference on Complex Networks, Cartagena, Colombia

Conferences, workshops and events

ORGANISATION

2024 Expert workshop for the “Validation of a dataset on internal migration”, Ministry of Social Development, Santiago, Chile
2023 Training workshop “An Introduction to Network Analysis for GIS”, GIScience 2023, Leeds, UK
· Workshop website: <https://crmnc.github.io/nets4gis/>
2023 Training Workshop “RECAST Project - Use of digital traces for the measurement and monitoring of population movements”, United Nations - ECLAC, Santiago, Chile
· Workshop website: <https://fcorowe.github.io/dfd4mobility/>
2023 Policy Workshop “RECAST Project”, United Nations - ECLAC, Santiago, Chile
2023 Workshop “RECAST Project - Developing a Collaborative Project Plan”, United Nations - DPPA, New York City, NY, US
2023 Research Roadshow, School of Environmental Sciences, University of Liverpool, UK

CONTRIBUTION AND PARTICIPATION

2024 AGILE 2024, Glasgow, UK
2024 Complenet 2024, Exeter, UK
2023 Specialist Meetings 2023: Spatial Data Science in an Age of Scientific Disruption, University of California Santa Barbara, Santa Barbara, US
2023 GIScience 2023, Leeds, UK
2023 Korean Research Institute of Human Settlements & GDSL knowledge exchange, Seoul, South Korea
2023 GISRUK23, Glasgow, UK
2023 Turing-Newcastle scoping workshop on “Data and Data Science for the Measurement, Understanding and Mitigation of Place-Based Disparities”, Newcastle University, UK
2022 Workshop ‘UA 2.0 – Inequalities in the Recovery of Cities and Regions’, Alan Turing Institute Urban Analytics, Liverpool, UK
2022 Korean Research Institute of Human Settlements & GDSL knowledge exchange, Liverpool, UK
2022 Conference on Complex Systems 2022, Palma de Mallorca, Spain
2022 GISRUK22, Liverpool, UK
2021 Global Young Scientists Summit, National Research Foundation, Singapore
2019 MacArthur Workshop on Urban Modelling & Complexity Science, CASA (UCL), London, UK
Talking Maths in Public, Isaac Newton Institute, University of Cambridge, Cambridge, UK
2019 LANet2019 - Latin American Conference on Complex Networks, University of Los Andes, Cartagena, Colombia
2019 Workshop on Economic Science with Heterogeneous Interacting Agents, UCL and City University of London, UK

- 2019 Enrico Fermi Intl. School on Computational Social Science and Complex Systems, Varenna, Italy
- 2018 NTU Winter School 2018 on Complexity Science, Nanyang Technological University, Singapore

Teaching

POSTGRADUATE

University of Liverpool

- 2022- *Module lead:* Population Data Science - Module website: <https://www.population-science.net/>
- 2023- *Lecturer:* Geographic Data Science - Module website: <https://pietrostefani.github.io/gds>
- 2022- *Supervisor:* MSc in Geographic Data Science Dissertation

UNDERGRADUATE

University of Liverpool

- 2023- *Supervisor:* BA in Geography Dissertation (9+ students)
- 2022- *Lecturer:* Field Class Year 3 (BA in Geography) in Toronto, ON, Canada
- 2022- *Lecturer:* Contemporary Population Dynamics
- 2021- *Supervisor:* MSc in Geographic Data Science Dissertation (total of 2 students)
- 2022-23 *Lecturer:* Population and Societies

University College London

- 2021- *Supervisor:* MSc in Urban Spatial Science Dissertation at CASA (total of 3 students)
- 2018-20 *Module lead:* Mathematics for Engineers (Dept. of Mathematics)
- 2017-20 *Small group teaching:* Calculus in Several Dimensions, Applied Mathematics and Newtonian Mechanics, Mathematical Methods, Bridging Course, Year 12 Summer Challenge, Quantitative Methods (Dept. of Mathematics)

Reserach supervision

PHD SUPERVISION

- 2023- Alice Varley. “Understanding social and spatial inequalities in common mental health disorders”. First supervisor, *University of Liverpool*.
- 2022- Andrea Nasuto. “Understanding the role of social media in promoting anti-migration sentiment and hate crime”. Second supervisor, *University of Liverpool*.
- 2022-24 Niall Newsham. “What do “left behind” areas look like over time?”. Second supervisor, *University of Liverpool*.

RESEARCH ASSISTANT SUPERVISION

- 2024 Michael Mahony. “TIMELY Project”. With Prof. Francisco Rowe, *University of Liverpool*.
- 2023 Andrea Nasuto. “RECAST Project”. With Prof. Francisco Rowe, *University of Liverpool*.
- 2023 Ruth Neville. “RECAST Project”. With Prof. Francisco Rowe, *University of Liverpool*.

Service

EDITORIAL ROLES

- 2023- Junior Editor, Computational Urban Science.
- 2017-21 Editor, [Chalkdust](#).

PHD EXTERNAL EXAMINER

- 2023 Jonathan Kent. “Urban Fabric Designed for Diversity: How the Structure of Great European Cities Influences Attitudes and Behavior”. *Universitat Pompeu Fabra, Spain*.

JOURNAL REVIEWS

International Journal of Geographic Information Science · Journal of Computational Urban Science · Cities · Environment and Planning B: Urban Analytics and City Science · Geographical Analysis · Computational Urban Science · Heliyon · Journal of Statistical Physics · PLOS ONE · Sage Research Methods

GRANT REVIEWS

Caixa – Social Research Call

COMMITTEE MEMBERSHIP

- 2024 Scientific committee. Netsci 2024. International School and Conference on Network Science, Québec City, Canada.

LEADERSHIP AND EQUALITY & DIVERSITY

- 2023- Early Career Academic Representative, School of Environmental Sciences, University of Liverpool
2018-21 Equality & Diversity Committee PhD representative, Department of Mathematics, UCL
· Contributed to the successful application for the Athena SWAN Silver Award 2021

OUTREACH

- 2024 Workshop for Year 12 students: “Mapping connections: a journey through Networks and Geography”. University of Liverpool, UK
2019 Drop-in activity at IMA Festival of Mathematics and its Applications, University of Greenwich, UK
2019 Talk: Understanding Complexity, Girls in Maths Day, St John Bosco College, London, UK

Relevant skills

Python (8+ years experience): data analysis, mathematical and statistical modelling, geospatial analysis, simulations, optimisation, visualisation, machine learning

Other programming languages: R, Matlab, C++/C, FORTRAN

Experience working with data at the **Secure Research Service of the UK Office for National Statistics**, including being **trained as a Full Accredited Researcher**

Software and cloud-based services: GitHub, LaTeX, Overleaf, Quarto, Microsoft Office, etc.

Languages: English (fluent), Spanish (native), Catalan (native), French (intermediate)

Last updated: June 27, 2024